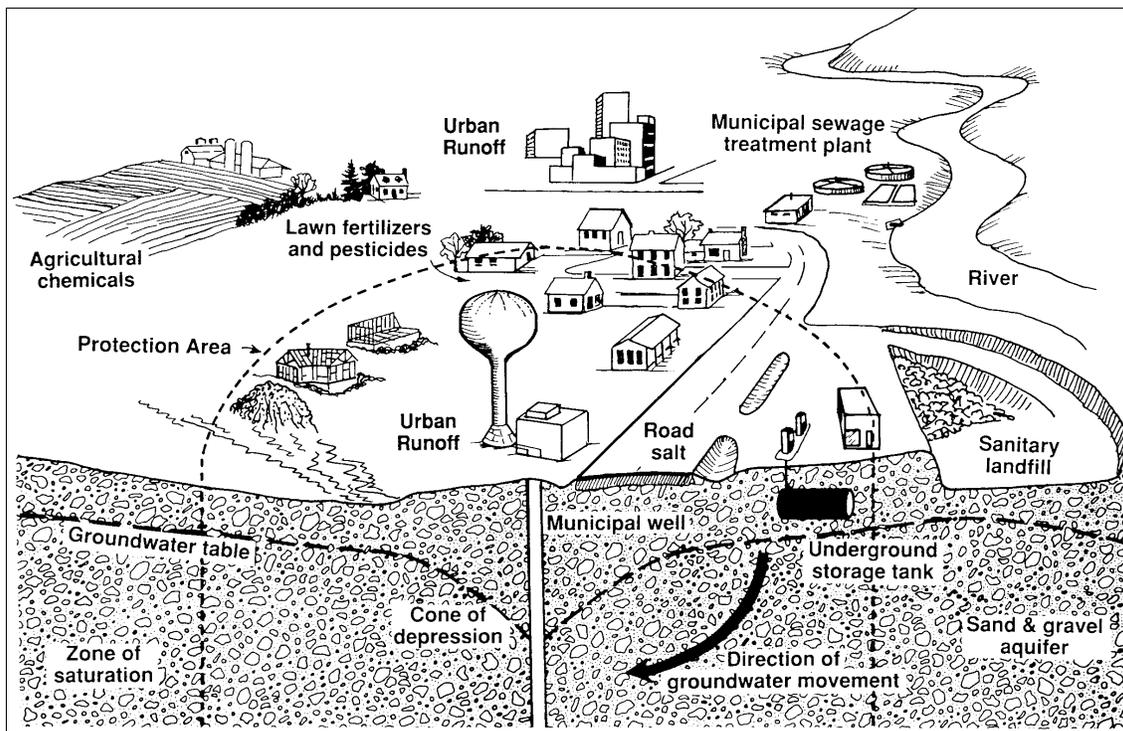


A GUIDE FOR CONDUCTING POTENTIAL CONTAMINANT SOURCE INVENTORIES FOR WELLHEAD PROTECTION



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INTRODUCTION

Wellhead Protection

Wisconsin has the good fortune of having an abundant supply of fresh, clean drinking water. As residents of Wisconsin, we have, for a long time, taken our drinking water supplies for granted.

Recently, it has been recognized that our drinking water supplies are more vulnerable to contamination than once believed. There are many potential sources of contamination that can threaten our public water supply wells. Just a small spill from any one of the many potential contamination sources can degrade the underlying groundwater supply to a point where it is unfit for human consumption.

The 1986 amendments to the federal Safe Drinking Water Act (SDWA) established a nationwide program aimed at protecting the groundwater that is used for public water supplies by requiring each state to develop and implement a wellhead protection program. Wellhead protection (WHP) is a proactive process by which a community can actively and efficiently protect its drinking water resources. This is accomplished by identifying the area contributing water to a public well (wellhead protection area), locating existing or potential contamination sources within the wellhead protection area and taking preventive measures within that area to minimize the potential for well contamination. By taking action to protect its wells, a community can avoid the costs associated with groundwater contamination and provide long-term protection of the groundwater for future generations.

Wisconsin's WHP program, approved by U. S. Environmental Protection Agency (EPA) in 1993, has both regulatory and voluntary components. Under the requirements of section NR 811.16(5), Wisconsin Administrative Code, all new municipal wells installed after May 1, 1992, must have a Department of Natural Resources approved WHP plan before placing the well into service. Appendix 1 lists the required elements of a plan for a new well. The Department's publication, "A Template for Preparing Wellhead Protection Plans for Municipal Wells" describes the information needed for each of the nine elements of a required WHP plan.

For wells in service on May 1, 1992, municipalities are encouraged but not required to develop WHP plans. Through the state program, local governments receive public education tools and guidance to help develop these proactive groundwater protection programs. The state wellhead protection program also lets each community develop a plan that will best suit its own needs and circumstances. This means that local leadership is vital to facilitate the successful completion and implementation of the local WHP program.

The 1996 SDWA Amendments supplemented the WHP program by creating a source water assessment program for both surface water and groundwater sources of public drinking water. The Amendments require each state to develop and implement a source water assessment program meeting the following steps:

1. delineate source water assessment area boundaries for all public water systems;
2. inventory existing and potential sources of contamination within those boundaries;
3. determine the susceptibility of the water systems to the contaminants; and
4. make the assessments available to the public.

Wisconsin must complete these steps for all 11,000 plus public groundwater systems and 20 surface water systems by May 6, 2003. Because of the size of this undertaking, the Department of Natural Resources will not be able to devote the resources to do the detailed contaminant

source inventory described in this publication. However, the inventory and susceptibility information gathered and made public by the Department should be valuable to communities developing a WHP plan.

The purpose of this document is to provide local governments with step-by-step instructions for conducting an inventory of potential sources of contamination when developing a comprehensive wellhead protection program for their community. (This document updates and replaces a 1993 publication (Publ WR 325-93) by the Department with the same title.) The inventory is a critical component of any successful WHP program because it locates activities that could pose a substantial threat to the community's drinking water supply. A comprehensive WHP plan also involves determining the area which needs to be protected (a wellhead protection area), and managing the potential sources of contamination identified during the inventory to minimize the potential for degradation of the water supply. The Annotated Bibliography (Appendix 2) lists additional publications that are available to assist a community in preparation of a wellhead protection plan.

What is a Contaminant Source Inventory?

A contaminant source inventory is an effort to locate and identify those facilities and activities within a designated area that may be a potential source of contamination to a public water supply well. This includes an inventory of past and present land use activities that might impact groundwater quality near a water supply well. A contaminant source inventory is one of the required elements of a WHP plan for a new well and is an essential element of all successful WHP programs.

A contaminant source inventory has a number of benefits to a community. First, it identifies the potential sources of contamination that could threaten the well so that a community can take appropriate action to manage those sources before the well becomes contaminated. Secondly, by knowing where potential contamination sources are located, it can be used by a community in the event of a contamination incident to focus the investigation and direct mitigation efforts. It can also be a valuable tool for siting new wells.

A contaminant source inventory also provides an opportunity to educate the public, including local officials, about groundwater contamination and protection. By educating the public and involving them in this protection effort, the community can benefit by increased public awareness and involvement in environmental issues and increased communication between the local government and the citizens of the community.

Potential Contamination Sources

There are many potential sources of contaminants that can seep into the ground and move through the soil to the water table and then move with groundwater to a well. Potential contamination sources include everything from septic tanks, dry cleaners and underground gasoline storage tanks to landfills, urban runoff and pesticides applied on farm fields. The front cover illustrates some potential contamination sources and how contaminants can move with groundwater toward a water supply well. The Public Water Supply Potential Contaminant Use Inventory Form (Form 3300-215) included as Table 1 lists 64 potential sources of contamination to be inventoried. This list includes the most common sources of groundwater contamination but is by no means a complete listing of all potential sources, since virtually anything spilled or placed on the ground has the potential to leach to groundwater.

The potential contamination sources will likely vary from community to community depending on that community's particular circumstances. For example, one community's well recharge area may be located outside of town, possibly in farmland, whereas the recharge area for the neighboring town may be found in the heart of the city. The potential contamination sources to be inventoried will be different in these two scenarios.

STEPS FOR CONDUCTING A POTENTIAL CONTAMINANT SOURCE INVENTORY

Determine the Area to be Inventoried

The first step in conducting a contaminant source inventory is to determine the area to be inventoried. For new municipal wells, section NR 811.16(5), Wis. Adm. Code, requires completion of "an inventory of existing potential contamination sources within a ½ mile radius of the proposed well and an assessment of existing potential contamination sources within the recharge area of the well." Therefore, a community proposing a new well must determine the area contributing recharge to the well. (The Department's publication, "A Template for Preparing Wellhead Protection Plans for Municipal Wells" describes how to delineate the recharge area for a well). If the recharge area extends beyond the ½ mile radius of the well, that whole recharge area must be surveyed for potential contaminant sources as well.

A community developing a voluntary plan for one or more existing wells is encouraged to include the same area described above for its inventory. The larger the area surveyed, the more likely that all the potential sources that could impact the well will be identified. There is also less likelihood that a community would have to go back and inventory an area within the wellhead protection area that is eventually delineated but that was not originally inventoried. The area to be inventoried for existing wells should include, at a minimum, the wellhead protection area delineated by the Department on the vulnerability assessment maps sent to municipal water supplies in the summer of 1998. For most communities, the delineated area was a circle around each well with a radius of 1200 feet based on a calculation using limited geologic and well information and a minimum radius of 1200 feet.

It is important to note that any delineation method involves some uncertainty regarding how accurately it represents the land area contributing recharge to a well. A circle drawn at an arbitrary distance obviously has much more uncertainty than a computer model utilizing site specific well and groundwater information. The uncertainty arises from both physical and temporal unknowns. The time frame chosen will also greatly affect the delineation. It is, therefore, suggested that the area to be inventoried be larger than any wellhead protection area delineated to take into account the uncertainty of the results of the delineation technique.

Determine the Sources to be Inventoried

Another decision affecting the scope of the inventory is determining which potential contaminant sources should be inventoried. As noted earlier, there are many potential sources of groundwater contamination. Obviously, the more complete the inventory, the more likely that all potential contamination sources will be identified. This gives a community a better opportunity to manage those sources to minimize the potential for groundwater contamination. Not all the sources that are found will necessarily be a threat to the water supply, but their presence should be noted anyway. Once the sources have been identified, the threat of each source to the water supply can be assessed to assist with management (see page 12 - Assess and Address Contaminant Sources Identified).

The Department recommends using Public Water Supply Potential Contaminant Use Inventory Form (Form 3300-215) included in this report as Table 1 for both voluntary and required WHP plans. This form was used by municipal water supplies for the 1998 vulnerability assessment program to identify contaminant sources within a delineated area. The instructions for filling out the form are included in Appendix 3. The form may be ordered from the Department or printed off the Department's Groundwater Section web site at <http://www.dnr.state.wi.us/org/water/dwg/gw/CUI-Form.htm> or <http://www.dnr.state.wi.us/org/water/dwg/gw/Appendx-N.doc>. A table which explains the potential contaminant sources and how to indicate them on a map is found in Appendix 3 and is available at <http://www.dnr.state.wi.us/org/water/dwg/gw/CUID-Frm.htm>.

Other lists of potential contamination sources are included in the 1993 and 1994 USEPA publications listed in Appendix 2 and section NR 811.16(4)(d), Wis. Adm. Code (see Appendix 1). Section NR 811.16(4)(d), Wis. Adm. Code, lists the required separation distances between a water supply well and a number of facilities or land uses which could cause groundwater contamination.

The community also needs to decide what information to collect for each site identified. At a minimum, each potential contamination source should be located on a map and a list kept of the approximate distance and direction from the well. However, there are at least some potential sources where additional information would be needed to evaluate the threat of that potential source. A community would be interested in knowing, for example, not just that there is a hazardous waste facility near the well, but what types and amounts of hazardous waste are present. A basic decision the community needs to make is whether to gather as much information as possible in one survey or whether to do a screening survey to identify potential sources and determine later what sites should be investigated further. This can be a determining factor in deciding who performs the inventory.

Select a Base Map

The next step is to select a base map on which the information obtained during the inventory will be recorded. There are many types of maps available to a community that could be used for the contaminant source inventory. For example, many communities have a plat map, a street map of the city or village, a water system map or a sewer system map.

In order to have consistency in the information that is provided, the Department will prepare maps, using scanned topographic maps or aerial photos if available, for those communities that request them. The Department intends to digitize the location of each potential contaminant source to create a statewide database. As part of that effort, it is important that the information be provided on maps with locational reference points and a consistent scale to avoid problems with accurately locating each source. Using photocopies of maps can also introduce distortion problems that make the maps less than desirable to use.

Contact Amy Ihlenfeldt of the Department's Groundwater Section at 608-266-2955 for maps for your community. She will be able to send you a map that contains the contaminant sources identified during the vulnerability assessment process in 1998. Because the Department will digitize potential contaminant sources identified through the vulnerability assessment and wellhead protection programs, any additional contaminant sources identified will be contained on the map sent to municipal water supplies for the next vulnerability assessment inventory in 2001.

If a community wishes to use a local map for the inventory or intends to digitize the potential contaminant sources and send the information electronically to the Department, contact Amy Ihlenfeldt to make sure the information gathered would be in a useable format for the Department. At a minimum, the community should use a map with a scale of 1:24,000 or larger (e. g., 1:12,000).

Another option is to purchase topographic quadrangle maps for the area to be inventoried. These maps (1:24,000 scale, 7.5 minute series) are available from the Wisconsin Geological and Natural History Survey (see address in Appendix 2). These maps are inexpensive, provide enough detail to determine streets and boundaries and can be transferred to a digital, computer-based format. Each person involved in the inventory work should have a copy of the appropriate topographic map or maps to avoid problems with distortion and scale due to copying of the map.

Identify Available Information

Before heading out with map in hand, it is useful to identify already available information that can shorten the amount of field inventory work that is needed. The maps completed as part of the 1998 vulnerability assessment would be a place to start because the local water utility has identified contaminant sources within the area delineated on a topographic map, which is a 1200 foot radius for most municipal wells. Figure 1 is an example vulnerability assessment map with sources located. Table 1 is a copy of Form 3300-215 filled out to reflect the example potential contaminant sources identified in the figure.

In addition, local officials or agencies may have already identified and located some potential contaminant sources. For example, planning or zoning boards or committees, health departments, fire departments, city licensing departments and public utilities might have information on potential sources such as present and future roadways and developments, utility lines, landfills, underground storage tanks, hazardous materials storage, hazardous material transportation routes, spills, septic tanks, etc.

The local phone directory would be another source of possible industrial sites and activities such as service stations, dry cleaners, photo processing shops, etc.

Either before or during the inventory, it would be useful to talk to people who have lived in the community for a long time and who might know of historical land uses. Their local knowledge may help in locating old gas stations (underground petroleum storage tanks), abandoned industrial sites (chemicals used in production), an old, abandoned landfill or other old potential sources which may not be obvious.

In addition to local sources of information, many state agencies compile lists of facilities and activities that they regulate. Information on statewide databases has been compiled in a Groundwater Coordinating Council publication titled, "Directory of Groundwater Databases." It can be ordered from the Department's Groundwater Section (see Appendix 2) or downloaded from the Department's Groundwater Section Web site at <http://www.dnr.state.wi.us/org/water/dwg/gw/Pubdwnld.HTM>. The directory provides a listing of groundwater related databases, in both computer and paper formats, and a contact person to call.

Although the statewide lists may contain a lot of useful information, it is important to check the locational accuracy of the data and date the list was last updated. Otherwise, their usefulness may be limited. These lists can be used as a background resource, but should never be used as a

replacement for a field survey. The types of lists available and the information needed to obtain them can be found in Appendix 4.

The information gathered in this step should be helpful in identifying the scope of the field inventory. Presumably there is enough information to eliminate some portions of the inventory area. There may be parks, forest or other land uses, for example, that would not likely contain potential contamination sources. Other areas like commercial development or an industrial park would be identified as areas requiring field visits. Hopefully, by following the steps described above the scope of the inventory will be manageable.

Select Persons for the Inventory

The above steps help identify how much work will be involved in completing the inventory. Now the question becomes who will do the inventory? If a community or water utility does not have staff available to conduct such an inventory, there are often people within the community that would be willing to volunteer their time and energies to help conduct the inventory.

Senior citizen groups or other volunteer organizations may be willing to volunteer their time. The city of El Paso, Texas, for example, recruited and trained retired community members through the local chapter of the Retired Senior Volunteer program (RSVP) to conduct a contaminant source inventory. After training, these volunteers did all the inventory work, including getting available information on sources as described above. The volunteers also established a task force after inventorying was completed to make sure the potential contamination sources were addressed. Appendix 5 contains suggestions for recruiting and training volunteers based on El Paso's experience. A report documenting the effort by the El Paso RSVP (Madarchik, 1992) is available from the El Paso RSVP (see Appendix 2) and the Department. Madarchik's publication contains suggestions for recruiting and training volunteers to conduct an inventory, example materials to encourage volunteering, example inventory forms and instructions, example press releases, and suggestions for recognizing volunteers.

The Wisconsin Rural Water Association (WRWA) assists communities with a population less than 10,000 with a number of services including wellhead protection planning. The WRWA may be able to help with a contaminant source inventory as part of a WHP planning effort. See Appendix 2 for their address.

We suggest training the person or persons who will do the inventory so that each volunteer provides the same information and the correct information. The Department can provide publications regarding WHP for those who will be doing the inventorying and may be able to assist in organizing a training session. We also recommend sending people out in pairs so that the team members can reinforce each other in collecting and recording information.

Table 1 – Example Form 3300-215 filled out

State of Wisconsin PUBLIC WATER SUPPLY POTENTIAL CONTAMINANT USE INVENTORY
Department of Natural Resources Form 3300-215

Facility Name: Marietta Water Utility		System Type (Check One): <input checked="" type="checkbox"/> Municipal <input type="checkbox"/> Other than Municipal <input type="checkbox"/> Nontransient Noncommunity <input type="checkbox"/> Transient Noncommunity	
Facility I.D. Number:	Total Number of Wells: 1	Review Area: <input checked="" type="checkbox"/> 1,200 ft radius <input type="checkbox"/> _____ ft <input type="checkbox"/> ½ mile radius <input type="checkbox"/> 200 ft radius	

Parts I and II of this form are authorized under ss. NR 809.12(2)(b), 809.21(3), and 809.25(5), Wis. Adm. Code, which pertain to sampling for drinking water contaminants. Completion of parts I and II of this form is required to apply for or extend monitoring waivers. Failure to complete this form upon request by the Department of Natural Resources may invalidate existing waivers or make the water system ineligible for new waivers and increase the number of samples required. Personally identifiable information requested on this form is likely to be used for purposes other than that for which it is originally being collected. DNR plans to make the information provided on this form available electronically on the Internet.

Instructions:

1. Look at a map of your water supply system and identify the review area of each active well in your system.
2. Indicate how many of each potential contaminant sources listed below are present within the review area of each well. Example: If 3 gas service stations are located within the review area of well No. 1, enter 3 in the row for “gas service station” under the column for well No. 1. If there are no potential contamination sources within the review area of a particular well, place an “x” in the row for “NONE” listed directly under POTENTIAL CONTAMINANT SOURCE.
3. If a map was provided with this form, indicate the location of all potential contaminant sources within the review area of each well by placing a circle with cross-hairs on the location and labeling it with the appropriate map code listed below. Example: Place a circled cross-hair “+” and contaminant code “CSS” on the map at the location of each gas service station. The number of “CSS’s” on the map should match the number of gas service stations indicated on this form. Sources with YES/NO option do not need to be located on the map.

PART I: POTENTIAL CONTAMINANT SOURCES

		Well No. <u> 1 </u>	Well No. <u> </u>			
Unique Well I.D. Number --->		GG831				
MAP CODE	POTENTIAL CONTAMINANT SOURCE					
	NONE					
	AGRICULTURE					
AFP	Agricultural farming (YES/NO)					
AFA	Animal Feedlot ⁵					
AIA	Irrigation system (YES/NO)					
AMS	Manure storage					
	BULK STORAGE/MATERIAL STOCKPILING					
BFS	Fertilizer storage/mixing ³ (e.g. Feed mill, Ag. Co-op)					
BGS	Grain storage site ³					
BPS	Pesticide storage / mixing / loading ³ (e.g. Feed mill, Ag. Co-op)					
BPT	Petroleum / chemical storage ¹ (Only include tanks 500 gallons or more)					
BSS	Road salt storage (Only include bulk storage sites)	1				
	COMMERCIAL					

CAI	Airport	(YES/NO)				
CBS	Auto body shop					
CBY	Boat yard					
CCW	Car wash (Only include those in unsewered area)	1				
CCE	Cemetery	1				
CDC	Dry cleaning ²	1				
CSS	Gas service station ²	2				
CLD	Laundromat (Only include those in unsewered area)					
CMW	Machine / metal working shop					
CVR	Motor vehicle repair shop	1				
CPS	Paint shop					
CPH	Photo processing (Not retail stores, only include actual processing facilities)	1				
CMP	Plating facility (jewelry/metal)					
CPR	Printing					
CRY	Rail yard					
CRT	Railroad track ²	1				
CSY	Scrap/junkyard					
CSP	Seed production plant ³					
	GENERAL					
GFA	Fuel storage tank - above ground (non-service station) ²					
GFB	Fuel storage tank - underground (non-service station) ²					
GSL	Sewer line (municipal) ⁵	(YES/NO)				
GST	Septic tank / cesspool ⁵	(YES/NO)				
	INDUSTRIAL					
IAS	Asphalt plant					
ICM	Chemical production (Only include large industrial facilities)					
IEE	Electrical and electronic products manufacturing					
IES	Electroplating / metal finishing facility ⁷	1				
IFM	Furniture or wood manufacturing / refinishing / stripping					
IFW	Foundry / smelting plant ⁷					
IMQ	Mining Operation / Mine waste	(YES/NO)				
IPM	Paper mill ⁶					
IPP	Pipeline (petroleum or chemical)	(YES/NO)				

IPC	Plastics manufacturer / molder ⁴					
ITP	Textile / polyester manufacturer ⁴					
IWT	Wood preserving facility ⁴					
	MISCELLANEOUS SOURCES AND CONDUITS					
MFT	Fire training facility					
MGC	Golf course (YES/NO)					
MLA	Laboratory (college, medical, school, private, etc.)					
MMP	Medical Installation (e.g. Hospital)					
MMI	Military installation ¹ (YES/NO)					
GWA	Water well (active production)					
GWI	Water well (unused or improperly abandoned) ³					
MWL	Wildlife refuge					
MOT	Other (specify) _____					
	WASTE MANAGEMENT					
WRP	ERRP Site ¹					
WHS	Hazardous waste generator (SARA Title III) ¹					
WIN	Incinerator (municipal)					
WDR	Class V injection well ³					
WLA	Landfill ¹					
WLS	Leaking underground storage tank (LUST site) ²					
WRF	Recycling facility					
WSS	Sludge spreading (YES/NO)					
WTS	Solid waste transfer station					
WSW	Storm water retention pond					
WUC	Superfund site ¹					
WWP	Wastewater treatment plant	1				
WWS	Wastewater seepage pond (sewage lagoon)					

- 1 Affects all types of waiver
cyanide waiver
- 2 Affects VOC waiver
- 3 Affects pesticide/herbicide waiver
- 4 Affects industrial chemical waiver
- 5 Affects microbial waiver
- 6 Affect Dioxin waiver
- 7 Affects

PART II: ASBESTOS AND COAL TAR (BENZO(A)PYRENE)

1. Is any part of your water distribution system constructed of materials containing asbestos fibers? Yes
 No
(Example: Asbestos-cement pipe)
2. Is any part of your water distribution system sealed with a product containing coal tar or Benzo(a)pyrene? Yes
 No
(Example: Pipe or reservoir lining)

PART III: INTEREST IN WELLHEAD PROTECTION (WHP)

Conduct the Source Inventory

Before starting the field work, it would be helpful to notify local law enforcement officials and the local media that people will be in the neighborhoods and business districts conducting the wellhead protection source inventory. Otherwise, people may be suspicious of people in their neighborhood knocking on doors. By providing the local media with information and education materials about wellhead protection, the media may be able to publicize the effort.

Now it is time to hit the streets. With the base map and a copy of Form 3300-215 (or other listing of potential contaminant sources) in hand and the inventory team or teams organized, the process of “field locating” the potential sources of contamination is the next step. The amount of information gathered will depend on what information the community would like to collect.

The community may only be interested in an initial screening of potential contamination sources. If that’s the case, it may be sufficient to locate the potential contaminant source on a map and identify the source type using Form 3300-215 or some other method. The Department suggests collecting some additional information to help make informed decisions about the need for further investigation of at least some potential sources to assess the potential for contamination. The Department suggests noting the type of facility, e. g. gas station, the owner, address and any other information which might be useful to the public water supply in deciding whether to revisit the facility.

If a community wants to do a complete inventory in one step, then it will be necessary to collect more complete information for each potential contamination source besides locating it on a map. It may be helpful to have a checklist or a form that can be filled out to provide information on the threat posed by each potential contamination source. For site visits, identify what questions need to be answered. For example, are materials stored on site? What kinds of materials are handled and stored at the facility? Are materials stored in the open? What waste products are produced and how are they disposed of? Are there above or below ground storage tanks present on the property? If so, how many and what capacities? Have there been any spills or accidents on the property in the past?

When a member of the inventory team makes contact with a homeowner or business, it may be better to use “soft” language such as “looking for areas of interest to the WHP program”, rather than “looking for potential contamination sources.” This may put the owner more at ease about having someone inquiring about how business is conducted on the premises.

Additional considerations in conducting a potential contamination source inventory:

1. Remember that underground and above ground storage tanks may also be found at these and other locations: auto dealerships, dry cleaners, fire stations, police stations, school bus barns, taxicab facilities, trucking companies, paving/construction contractors, pesticide and/or fertilizer dealers, printers, bus lines, airports, pest control services and laboratories.
2. Keep an eye out for unused, non-abandoned wells. They are of concern because they can be sources of conduits for migration of contaminants into the subsurface. Often, these wells will be difficult to see until you are right on top of them. Most successful searches employ a combination of records searching, talking with local residents, and actually looking for the well. Check the older sections of town that may have had private wells and septic systems before being annexed into the city. There may be useful information in original plans for wastewater treatment plants.

3. Make note of land use within the delineated area for potential non-point sources of contamination. For example, cultivated farmland may be a source of pesticides and fertilizers applied to crops, but which could seep into the subsurface. The same may be true of residential areas as well. Nurseries/florists and orchards are other potential sources of contamination.
4. Don't be limited by the list of contaminants from Form 3300-215 or whatever list is being used. If something looks unusual, suspicious or like it could cause a groundwater contamination problem, mark it on the map and make any appropriate notes.

When the contaminant source inventory has been completed, some recognition should be provided for those who participated in the process, especially those who worked voluntarily. The publication by Lillian Madarchik (see Appendix 2) mentioned earlier has a number of ideas for showing appreciation for volunteers. She also recommends giving volunteers the opportunity to work on the next steps of the process so that they have a voice in protecting their water supply from the sources they helped identify.

NEXT STEPS

Assess and Address Contaminant Sources Identified

Once the inventory is finished, a map should be compiled showing all the potential sources of contamination that have been identified in relation to the water supply well or wells. The map and other information available from the inventory can be used to assess the significance of the potential contamination sources and determine what further management actions might be appropriate.

Communities which are developing a WHP plan for a new well not only need to inventory potential contamination sources within ½ mile of the proposed well, but also assess the existing potential contamination sources within the recharge area of the well. The community should develop a priority ranking of the potential contamination sources within the recharge area to highlight those potential sources deserving special emphasis when implementing the WHP management plan. There is no magic way to develop a priority ranking. Among the factors that should be considered are the type of the potential contamination source, its distance from the well, groundwater flow direction and ability to manage the source to prevent or minimize any releases from that source.

Once some type of priority ranking has been developed, the community can prioritize what sources should be addressed first and begin to decide what actions to take to protect its well. If there is a potential source of contamination for which little or no information is known, it can be identified and additional information gathered.

There are many options, both regulatory and nonregulatory, that communities choose from to manage potential contaminant sources. Some of the options include adopting a zoning ordinance, installing monitoring wells around potential sources, keeping an inventory of underground storage tanks or other potential sources, working with owners of potential contaminant sources to reduce contamination potential and providing incentives for contaminant use reduction. The Wisconsin Wellhead Protection Program Plan (WDNR, 1993) discusses management approaches available for state and local governments. The Annotated Bibliography (Appendix 2) also contains references for additional information on WHP Management.

Complete a Wellhead Protection Plan

Completing a contaminant source inventory and addressing the sources identified are parts of the needed activities to complete a wellhead protection plan. All the elements for a required wellhead protection plan are listed in Appendix 1. Communities are urged to use the information gathered during the inventory plus the other necessary information to complete the wellhead protection planning process as the next step. Conducting a contaminant source inventory isn't very useful if the information isn't then used to find ways to protect the well or wells that could be affected.

The Department's "Template for Preparing Wellhead Protection Plans for Municipal Wells" plus the publications listed in Appendix 2 contain useful information to assist in completing the wellhead protection plan for a community. The Department can offer help in working through the wellhead protection program. Communities with a population of 10,000 or less can also contact the WRWA for assistance.

Update the Potential Contaminant Source Inventory

Maintaining and updating the contaminant source inventory should be an important part of an on-going WHP effort. If the inventory information isn't updated periodically, potential contaminant sources may be sited within the inventoried area that could adversely affect the well. Each community should decide on a methodology to update the inventory at least on some periodic basis to identify any potential problems early. The Department has completed digitizing the vulnerability assessment maps that were completed by communities in the summer of 1998. That map can serve as a baseline for keeping track of additional sources of contamination within the delineated area.

Each community is strongly encouraged to send the Department the original maps used for the potential contaminant source inventory as soon as possible after the inventory is complete so that the sources identified can be digitized accurately by the Department. The Department will then update the vulnerability assessment maps for the next cycle as communities perform contaminant source inventories and provide that information to the Department. Contact Amy Ihlenfeldt at 608-266-2955 before sending maps to the Department for digitizing. The Department will return them once digitizing is completed.

Appendix 1

NR 811 REQUIREMENTS

NR 811 Wellhead Protection Plan Requirements

A wellhead protection plan submitted under section NR 811.16(5), Wis. Adm. Code, shall include but is not limited to:

- (a) identification of the recharge area for the proposed well;
- (b) identification of the zone of influence for the proposed well;
- (c) identification of the groundwater flow direction;
- (d) an inventory of existing potential contamination sources within a ½ mile radius of the proposed well and an assessment of existing potential contamination sources within the recharge area of the well;
- (e) establishment of a wellhead protection area for the proposed well. The wellhead protection area shall encompass, at a minimum, that portion of the recharge area equivalent to a 5 year time of travel to the well. The wellhead protection area may be determined by hydrogeologic investigation.
- (f) A public education program for wellhead protection.
- (g) A water conservation program.
- (h) A contingency plan for providing safe water and protecting the well from contamination based on the inventory and assessment of potential contamination sources.
- (i) A management plan, based upon an assessment of alternatives for addressing potential contamination sources, describing the local ordinances, zoning requirements, monitoring program, and other local initiatives proposed within the wellhead protection area established in subpar. (e). The management plan shall address maintaining the separation distances established by well siting in sub. (4)(d).

Minimum Separation Distances in Section NR 811.16(4)(d), Wis. Adm. Code

Section NR 811.16(4)(d), Wis. Adm. Code, requires the following separation distances between a water supply well and the following potential contamination sources:

1. 50 feet - Storm sewer drain
2. 200 feet - Any sanitary sewer main, lift station or single family residential fuel oil tank. A lesser separation distance may be allowed for sanitary sewer mains where the sanitary sewer main is constructed of water main materials and joints and pressure tested in place to meet

current AWWA 600 specifications. In no case may the separation distance between a well and a sanitary sewer main be less than 50 feet.

3. 400 feet - A septic tank receiving less than 8,000 gallons per day, a cemetery or a storm water drainage pond.
4. 600 feet - Any gasoline or fuel oil storage tank installation that has received written approval from the department of commerce or its designated agent under s. Comm 10.10.
5. 1000 feet - Land application of municipal, commercial or industrial waste; industrial, commercial or municipal waste water lagoons or storage structures; manure stacks or storage structures; and septic tanks or soil adsorption units receiving 8,000 gallons per day or more.
6. 1200 feet - Any solid waste storage, transportation, transfer, incineration, air curtain destructor, processing, wood burning, one time disposal or small demolition facility; sanitary landfill; coal storage area; salt or deicing material storage area; gasoline or fuel oil storage tanks that have not received written approval from the department of commerce or its designated agent under s. COMM 10.10; bulk fuel storage facilities; and pesticide or fertilizer handling or storage facilities.

Appendix 2

ANNOTATED BIBLIOGRAPHY

The following bibliography is divided into categories to make it easier to find information on a particular component of wellhead protection.

General Wellhead Protection References

Born, Steve, Douglas Yanggen and Alexander Zaporozec, 1987, A Guide to Groundwater Quality Planning and Management for Local Governments, Wisconsin Geological and Natural History Survey (WGNHS) Special Report 9, 91 p. This publication discusses in some detail the individual steps in the WHP process. The discussion on regulatory and nonregulatory tools is particularly noteworthy.

Osborne, Tom, Jenifer Sorensen, Mark Knaack, David Mechenich and Michael Travis, 1989, Designs for Wellhead Protection in Central Wisconsin - Case Studies in the Town of Weston and City of Wisconsin Rapids, Central Wisconsin Groundwater Center, 95 p. plus appendix. Available from Central Wisconsin Groundwater Center (715-346-4270). This document starts with some basics about WHP, then discusses WHP area delineation, time of travel calculations, potential contaminant source inventory, and designing groundwater protection strategies.

U. S. Environmental Protection Agency (EPA), 1991, Protecting Local Groundwater Supplies Through Wellhead Protection, EPA 570/9-91-007, 18 p. This is intended to be used by city or town officials, water supply managers or interested citizens. It contains a five-step process to help delineate, inventory and manage a local WHP area.

U. S. EPA, 1993, Wellhead Protection: A Guide for Small Communities - Seminar Publication, EPA/625/R-93-002, 144 p. This publication discusses groundwater fundamentals, sources of contamination, the 5-step WHP process; provides examples, including Cottage Grove; and provides resources for additional information.

Wisconsin Department of Natural Resources (WDNR), 1993, Wellhead Protection Program Plan for Public Water Supplies, 29 p. plus appendices. This describes how Wisconsin will implement its WHP program. The program plan was approved by the U. S. Environmental Protection Agency in 1993. This document is downloadable (except appendices) at the Department's Groundwater Section Web site (see below).

WDNR, 1999, A Template for Preparing Wellhead Protection Plans for Municipal Wells, PUBL DG-053 99. This document describes the information needed for each of the nine steps of a written wellhead protection plan laid out in section NR 811.16(5), Wis. Adm. Code. Example language is provided.

U. S. Geological Survey (USGS), 1995, Groundwater Flow and Quality in Wisconsin's Shallow Aquifer System, USGS Water Resources Investigations Report 90-4171, 42 p. This report provides an overview of groundwater movement and quality in the shallow aquifers of Wisconsin. The deeper aquifers are described to the extent that they affect or are affected by the shallow aquifers. Available from USGS Madison office.

Wellhead Protection Delineation

Born, Steve, Douglas Yanggen, Allan Czecholinski, Raymond Tierney, and Ronald Hennings, 1988, Wellhead-Protection Districts in Wisconsin: An Analysis and Test Applications, WGNHS Special Report 10, 75 p. Reviews methods for delineating WHP districts and serves as a guide for hiring private consultants.

U. S. EPA, 1991, Wellhead Protection Strategies for Confined Aquifer Settings, EPA 570/9-91-008, 168 p. This report discusses approaches to determine if an area is confined and what delineation methods are appropriate. Two examples are provided.

U. S. EPA, 1991, Delineation of Wellhead Protection Areas in Fractured Rocks, EPA 570/9-91-009, 144 p. Written by Ken Bradbury, Maureen Muldoon and Alex Zaporozec. This report discusses two case studies from Wisconsin and discusses the options for WHP delineation in fractured rocks.

U. S. EPA, 1994, Groundwater and Wellhead Protection - A Handbook, EPA/625/R-94/001, 269 p. Much of the book discusses methods for WHP area delineation. There is also guidance on developing a WHP plan, including a contaminant source inventory and management options, plus several case studies.

WDNR, 1992, Determining Wellhead Protection Boundaries - An Introduction, PUBL-WR-313-92, 24 p. Explains the basics of the water cycle and groundwater flow and compares six methods of delineating WHP areas, including costs.

Contaminant Source Inventory

Cross, Brad L., and David P. Terry, 1991, A Groundwater Protection Strategy: The City of El Paso, Texas Water Commission Report 91-01, 154 p.

Madarchik, Lillian Smith, 1992, How-to Manual for Groundwater Protection Projects: Volunteers and the Environment, El Paso (Texas) Retired Senior Volunteer Program (RSVP) in cooperation with the National Association of RSVP Directors, Inc., 26 pages plus appendices. Available from the WDNR or Winifred Dowling, El Paso RSVP Office (915-541-4375).

U. S. EPA, 1991, Guide for Conducting Contaminant Source Inventories for Public Drinking Water Supplies, 570/9-91-014, 53 p. +Appendices. Includes discussion of contaminant sources, use of existing data, options for gathering information and the importance of managing the data collected. Several case studies are also included.

Wisconsin Groundwater Coordination Council, 1998, Directory of Groundwater Databases, 38 p. This directory provides a listing of groundwater-related databases, in both computer and paper formats, and a contact person to call for that information. Available from the WDNR. This document is downloadable at the Department's Groundwater Section Web site (see below).

Wellhead Protection Management

Born, Steve, Douglas Yanggen and Alexander Zaporozec, 1987, A Guide to Groundwater Quality Planning and Management for Local Governments, WGNHS Special Report 9, 91 p. This publication discusses in some detail the individual steps in the WHP process, especially regulatory and nonregulatory management tools.

Horsley, S. and J. Witten, 1995, A Guide to Wellhead Protection, American Planning Association, Planning Advisory Service Report 457/458, 102 p. This publication describes groundwater fundamentals, groundwater contamination sources, management and financial strategies for WHP, and examples WHP ordinance language. Available from APA publications office, 122 S. Michigan Ave., Chicago, IL 60603-6107.

U. S. EPA, 1989, Wellhead Protection Programs: Tools for Local Governments, EPA 440/6-89-002, 50 p. Describes the tools available, both regulatory and non-regulatory, that local units of government have available for use to protect their water supply.

Yanggen, D. A. and Bruce Webendorfer, 1991, Groundwater Protection Through Local Land-Use Controls, WGNHS Special Report 11, 48 p. Describes state and local groundwater protection powers; analyzes legal issues relative to local groundwater protection; and describes how local governments can use zoning and subdivision regulations to protect groundwater.

Yanggen, D. A. and Leslie Amrhein, 1991, Groundwater Quality Regulations: Existing Governmental Authority and Recommended Roles, WGNHS Special Report 12, 109 p. This report focuses on roles that local governments can plan in joint local/state regulatory schemes to protect groundwater. It is intended for persons preparing local regulations and their legal advisors.

Education

WDNR, 1984, Groundwater and Land Use in the Water Cycle, PUBL-WR104 84. Four color poster available in 11 by 17 and 24 by 38 inch formats. Available from DNR, WGNHS and UW Extension. Graphically portrays how the water cycle works and where groundwater fits into the water cycle.

WDNR, 1989, Groundwater: Protecting Wisconsin's Buried Treasure, PUBL-WR-224-89, 32 p. Provides an overview of groundwater concepts and protection.

WDNR, 1990, Wisconsin's Groundwater Study Guide. A curriculum development guide primarily for 6th to 9th grade earth science teachers and adaptable to older and younger students, informal education settings and the general public. The guide comes with a packet which includes copy-ready student activity sheets, overhead masters, one large and 10 small Groundwater and Land Use in the Water Cycle posters, and Groundwater: Protecting Wisconsin's Buried Treasure.

WDNR, 1996, Wellhead Protection: An Ounce of Protection, PUB-DG-039 96 REV. A brochure that explains what WHP is, why it is necessary and how to begin preparing a WHP plan. Viewable at the Department's Bureau of Drinking Water and Groundwater Web site: www.dnr.state.wi.us/org/water/dwg/wellhead.htm

WDNR, 1998, Answers to Your Questions About Groundwater, PUBL-DG-049 98 REV. A brochure which includes common questions concerning groundwater problems, responsibilities and solutions. Viewable at the Department's Groundwater Section Web site (see below).

WDNR, 1995, Better Homes and Groundwater, PUBL WR 386-95, 15 p. This is a homeowner's guide to groundwater smart maintenance of lawns, gardens, and household hazardous wastes. Viewable at the Department's Groundwater Section Web site (see below).

Publication Availability

Copies of the above WDNR publications are available from David Lindorff, Groundwater Section, WDNR, P. O. Box 7921, Madison, WI 53707-7921. Phone: 608-266-9265. Email: lindod@dnr.state.wi.us

WDNR Groundwater Section Web site for viewable documents:

www.dnr.state.wi.us/org/water/dwg/gw/Webview.HTM

WDNR Groundwater Section Web site for downloadable documents:

www.dnr.state.wi.us/org/water/dwg/gw/Pubdwnld.HTM

Copies of topographic maps and publications by the Wisconsin Geological and Natural History Survey are available from the Survey at 3817 Mineral Point Road, Madison, WI 53705. Phone: 608-263-7389.

Copies of the U. S. EPA publications are available from the National Technical Information Service, U. S. Department of Commerce, Springfield, VA 22161. Phone: 1-800-553-6847. Web site - www.ntis.gov

Other Sources of Information

1. DNR Regulatory Wellhead Protection Coordinator

Lee Boushon

Public Water Supply System Section

Wisconsin Department of Natural Resources (WDNR)

P. O. Box 7921

Madison, WI 53707-7921

(608) 266-0857

email: boushl@dnr.state.wi.us

2. DNR Voluntary Wellhead Protection Coordinator

David Lindorff

Groundwater Section

WDNR

P. O. Box 7921

Madison, WI 53707-7921

email: lindod@dnr.state.wi.us

3. DNR Regional Water Supply Specialists

Northeast Region

1125 N. Military Avenue

Box 10448

Green Bay, WI 54307-0488

(920) 492-5800

South Central Region

3911 Fish Hatchery Road

Fitchburg, WI 53711

(608) 275-3266

Southeast Region

2300 N. Dr. Martin Luther King Jr. Dr.

P. O. Box 12436

Milwaukee, WI 53212

(414) 263-8500

West Central Region

1300 W. Clairemont Avenue

P. O. Box 4001

Eau Claire, WI 54702-4001

(715) 838-6076

Northern Region
810 W. Maple Street
P. O. Box 309
Spooner, WI 54801
(715) 635-2101

Northern Region
107 Sutliff Ave.
P. O. Box 818
Rhineland, WI 54501
(715) 365-8900

4. The Wisconsin Geological and Natural History Survey (WGNHS) can provide information on what type of geological and hydrogeological data are available for your area. For a list of WGNHS publications, write or call:

Wisconsin Geological and Natural History Survey
3817 Mineral Point Road
Madison, WI 53705
(608) 262-1705 or 263-7389

5. The Central Wisconsin Groundwater Center is a clearinghouse for information on groundwater issues in central Wisconsin.

Central Wisconsin Groundwater Center
College of Natural Resources, room 224
University of Wisconsin - Stevens Point
Stevens Point, WI 54481
(715) 346-4270

6. The Wisconsin Rural Water Association (WRWA) has been providing technical assistance to rural communities (with water supplies that serve 10,000 people or less) that are trying to establish WHP programs.

Wisconsin Rural Water Association
350 Water Way
Plover, WI 54467
(715) 344-7778

7. Your county University of Wisconsin - Extension office can provide general information on wellhead protection. Look for the address and phone number in the telephone book under the county listings.

Appendix 3

INSTRUCTIONS FOR COMPLETING FORM 3300-215 (Public Water Supply Potential Contamination Use Inventory Form)

Please complete the following steps:

1. For each active well in your system, identify the area on the map within which the contaminant source inventory will be done. This is called the “review area” on Form 3300-215.
2. Determine what contaminant sources listed on Form 3300-215, Part I, are located on or inside the review area of each well. The attached Potential Contaminant Sources table lists and describes the contaminant sources, identifies the specific contaminants associated with many of the sources and indicates how to show each contaminant source on a map.
3. Mark the location of potential contaminant sources identified in step 2 on the map. This may be done in a number of ways. If the source is already on the map, such as a building, you may simply circle it. If it is not already on the map you should place a circle with cross-hairs on the location of the source. Perimeters of larger sources should be outlined. Label each source with the 3-character code listed on Form 3300-215. An example of a completed map is attached as Figure 1.
4. Indicate how many of each potential contaminant sources listed on Form 3300-215 are present within the review area of each well. Example: If 3 gas service stations are located within the review area of well No. 1, enter 3 in the row for “gas service station” under the column for well No. 1. If there are no contamination sources within the review area of a particular well, place an “x” in the row for “NONE” listed directly under CONTAMINANT SOURCE. An example of a completed form is attached as Table 1.
5. Complete Part II on Form 3300-215.

POTENTIAL CONTAMINANT SOURCES

CONT CODE	CONTAMINANT SOURCE	DESCRIPTION	SPECIFIC CONTAMINANTS	HOW TO INDICATE C MAP
	AGRICULTURE			
AFP	Agricultural farming (YES/NO)	Active farming operations	Pesticides, fertilizers	No location re
AFA	Animal Feedlot		Livestock sewage wastes, nitrates, phosphates, chloride, chemical sprays and dips for controlling insect, bacterial, viral , and fungal pests, coliform bacteria, viruses	Outline perimeter/poir
AIA	Irrigation system (YES/NO)	Agricultural irrigation		No location re
AMS	Manure storage	Lined and unlined manure storage facilities	Livestock sewage wastes, nitrates, phosphates, chloride, chemical sprays and dips for controlling insect, bacterial, viral , and fungal pests, coliform bacteria, viruses	Point
	BULK STORAGE/MATERIAL STOCKPILING			
BFS	Fertilizer storage/mixing	Feed mill, agricultural co-op	Nitrates	Point
BGS	Grain storage site		Fungicides	Point
BPS	Pesticide storage / mixing / loading	Feed mill, agricultural co-op	Herbicides, insecticides, rodenticides, fungicides, avicides	Point
BPT	Petroleum / chemical storage	500 gallon or more	Specific to petroleum/chemical product stored at site	Point
BSS	Road salt storage	Bulk storage sites	Sodium chloride, calcium chloride, waste oil	Point
	COMMERCIAL			
CAI	Airport (YES/NO)		Jet fuels, deicers, batteries, diesel fuel, chlorinated solvents, automobile wastes, heating oil, building wastes	No location re
CBS	Auto body shop		Paints, solvents	Point
CBY	Boat yard		Diesel fuels, batteries, oils, septage from boat waste disposal areas, wood preservatives, paints, waxes, varnishes, automotive wastes	Point
CCW	Car wash	Car washes in unsewered areas	Soaps, detergents, waxes, miscellaneous chemicals	Point
CCE	Cemetery		Leachate (formaldehyde), lawn and maintenance chemicals	Outline perim
CDC	Dry cleaning		Solvents (tetrachloroethylene, petroleum solvents, freon), spotting chemicals (trichloroethane, ammonia, rust removers)	Point
CSS	Gas service station		Gasoline, oils, solvents, miscellaneous wastes	Point
CLD	Laundromat	Laundromats in unsewered areas	Detergents, bleaches, fabric dyes	Point
CMW	Machine / metal working shop		Solvents, metals, organics, sludges, cutting oils, degreasers	Point
CVR	Motor vehicle repair shop		Waste oils, solvents, acids, paints, automotive wastes,	Point
CPS	Paint shop		Paint, paint thinner, solvents	Point
CPH	Photo processing	Only include processing facilities, don't include photo drop off sites	Cyanides, biosludges, silver sludges	Point

CMP	Plating facility	Jewelry and metal plating	Cyanide, heavy metals	Point
CPR	Printing		Solvents, inks, dyes, oils, organics, chemicals	Point
CRY	Rail yard			Outline perimeter
CRT	Railroad track			Line
CSY	Scrap/junkyard		Oil, gasoline, antifreeze, PCB contaminated soils, lead acids batteries	Outline perimeter
CSP	Seed production plant			Point
	GENERAL			
GFA	Fuel storage tank - above ground	Non-service station tanks	Gasoline, diesel fuel, other petroleum products	Point
GFB	Fuel storage tank - underground	Non-service station tanks	Gasoline, diesel fuel, other petroleum products	Point
GSL	Sewer line (YES/NO)	Municipal sewer lines	Septage, coliform bacteria, viruses, nitrates	No location required
GST	Septic tank / cesspool (YES/NO)		Septage, coliform bacteria, viruses, nitrates, heavy metals, synthetic detergents, cooking and motor oil, bleach, pesticides, paints, paint thinner, photographic chemicals, septic tank cleaner chemicals, chlorides, sulfate, calcium, magnesium, potassium, phosphate	No location required Indicate approximate number of septic tanks
	INDUSTRIAL			
IAS	Asphalt plant		Petroleum derivatives	Point
ICM	Chemical production	Industrial chemical production facilities		Point
IEE	Electrical and electronic products manufacturing		Cyanides, metal sludges, caustics, solvents, oils, acids, alkalis, paints, methylene chloride, tetrachloroethylene, trichloroethane, acetone, toluene, PCBs	Point
IES	Electroplating / metal finishing facility		Acids, alkaline solutions, cyanide, metallic salts, solvents, cyanide, heavy metal contaminated wastewater	Point
IFM	Furniture or wood manufacturing / refinishing / stripping		Paints, solvents (toluene, methylene chloride), degreasing sludges	Point
IFW	Foundry / smelting plant		Cyanides, sulfides	Point
IMQ	Mining / Mine waste (YES/NO)		Cyanide, sulfides, metals, acids drainage	No location required
IPM	Paper mill		Metals, acids, minerals, sulfides, chemicals, sludges, chlorine, hypochlorite, chlorine dioxide, hydrogen peroxide	Point
IPP	Pipeline (petro./chem.) (YES/NO)			No location required
IPC	Plastics manufacturer / molder		Solvents, oils, organics and inorganics, paint wastes, cyanides, acids, alkalis, sludges, esters, surfactants, glycols, phenols, formaldehyde, peroxides	Point
ITP	Textile / polyester manufacturer			Point
IWT	Wood preserving facility		Treated wood residue, preservatives (pentachlorophenol, chromate, copper arsenate.), tanner gas, paint sludges, solvents, creosote, coating wastes	Point

	MISCELLANEOUS			
MFT	Fire training facility			Point
MGC	Golf course (YES/NO)		Fertilizers, herbicides, pesticides for controlling mosquitoes, ticks, ants, gypsy moths, and other pests., automotive wastes	No location re
MLA	Laboratory (college, medical, school, private, etc.)		Biological wastes, disinfectants, acids, formaldehyde, miscellaneous chemicals	Point
MMP	Medical Installation (e.g. Hospital)		X-ray developers and fixers, infectious wastes, radiological wastes, biological wastes, disinfectants, asbestos, beryllium, acids, formaldehyde, miscellaneous chemicals	Point
MMI	Military installation (YES/NO)			No location re
GWA	Water well (active production)			Point
GWI	Water well (unused or improperly abandoned)			Point
MWL	Wildlife refuge			Outline perime
MOT	Other (specify) _____			
	WASTE MANAGEMENT			
WRP	ERRP Site	Sites on the DNR "Emergency and Remedial Response" list		Point
WHS	Hazardous waste generator (SARA Title III)	Any facility listed on the SARA Title III list thought to pose a threat to the well.		Point
WIN	Incinerator (municipal)			Point
WDR	Class V injection well	Any well, drilled or dug hole, used to inject fluids into the subsoil	Chlorides, pathogens, petroleum products, pesticides	Point
WLA	Landfill	Solid and hazardous waste sites listed in the DNR "Registry of Waste Disposal Sites in Wisconsin"	Leachate	Outline perime
WLS	Leaking underground storage tank (LUST)	LUST Sites included in the DNR "Leaking Underground Storage Tank List"	Gasoline, diesel fuel, other petroleum products	Point
WRF	Recycling facility			Point
WSS	Sludge spreading (YES/NO)	Municipal wastewater sludge, paper mill sludge	Viruses, coliform bacteria, heavy metals, dioxins	No location re
WTS	Solid waste transfer station			Point
WSW	Storm water retention pond			Point
WUC	Superfund site	Sites listed in the DNR "Superfund Sites in Wisconsin"		Point
WWP	Wastewater treatment plant		Coliform bacteria, viruses	Point
WWS	Wastewater seepage pond	Sewage lagoons	Coliform bacteria, viruses	Point

Appendix 4

LISTS OF POTENTIAL CONTAMINANT SOURCES

This appendix lists databases, reports, or lists that contain information on potential contaminant sources which may be in a wellhead protection area. The appendix is organized alphabetically by state agency and indicates a contact person or persons for each database or report. A fee may be charged to obtain some of the data. The information described below is derived from Wisconsin Groundwater Coordinating Council, 1998 (see Appendix 2).

Department of Commerce

Division of Environmental and Regulatory Services

Underground Storage Tank/Above Ground Storage Tank Registration

Karine Blazek (608) 267-1384

Information on petroleum tanks for residential, farms, gas stations, industrial, and schools. This is an ORACLE database with a client server component. Currently there are approximately 150,000 individual tank systems tracked and are identified by a site identification number. The information is statewide and is updated weekly.

Check the COMM home page at: [Http://badger.state.wi.us/commerce/](http://badger.state.wi.us/commerce/)

Commerce Bulletin Board System

Karine Blazek (608) 267-1384

Provides information on Department of Commerce issues and activities. Within the bulletin board system is a searchable database of above and below ground storage tank locations. Selections can be made by Fire Dept. ID, specific tank ID, or county. This bulletin board system can be accessed by dialing (608) 264-6143. Modem settings are 8,N,1, and ANSI BBS.

PECFA TRACKER System

Miles Mickelson (608) 267-4545

Carol Klewin (608) 266-3713

Information on petroleum remediation costs PECFA claimants and cleanup actions. This is an ORACLE database with a client server component. Currently there are approximately 12,000 individual sites tracked and are identified by zip code and addresses. The information is statewide in extent and is updated daily. The database has GEO locator capabilities.

Check the COMM home page at: [Http://badger.state.wi.us/commerce/](http://badger.state.wi.us/commerce/)

Department of Military Affairs, Wisconsin Emergency Government

Bureau of Technological Hazards

Hazardous Materials Storage (EPCRA 302, 303, 304, 311, 312, 324)

William Clare, EPCRA Program Manager (608) 242-3220

Database includes facility name, owner, industry classification, and whether facility emergency response plan is required. Hazardous materials are listed and include the

chemical name, chemical abstract (CAS) number, and maximum amount present at the facility at any one time. Federal law requires that trade secret and confidential location information be withheld from disclosure.

Department of Natural Resources

Bureau of Drinking Water and Groundwater

Class V Injection Wells

Rich Roth (608) 266-2438

Spreadsheet of Class V injection well locations, including remediation-related injection wells, storm water drainage wells, geothermal injection wells and large-scale septic systems.

Bureau for Remediation and Redevelopment

Bureau for Remediation and Redevelopment and Bureau of Waste Management PC Bulletin Board System

Chris Zenchenko (608) 267-3543

A dial-up PC bases bulletin board system for the distribution of program information, reports, studies, guidance documents, and program database files. The system currently has one phone line available with a 28.8k modem. The phone number is (608) 261-6455. Modem settings should be 8,N,1 and ANSI BBS. Files are mirrored on the Bureau's world wide web site.

Corrective Action Sites

Mark Gordon (608) 266-7278

Information on 150 hazardous waste facilities storing or treating hazardous waste after November 1980.

Hazard Ranking List

Robert Strous (608) 266-2699

Lists sites by name, location, hazard ranking score, reason for substantial danger (includes groundwater), and repair actions. One page descriptions of the sites explain sites in more detail.

Licensed SW Landfills Which are Identified As Handling Contaminated Soil On Their 1996 Tonnage Report

Julie Ivanov (608) 267-7550

This list is generated from the BRRTS System, and lists landfills that have accepted petroleum contaminated soils in the past. Landfill name, DNR district, contact person, address, and telephone number are available.

Registry of Waste Disposal Sites

Robert Strous (608) 266-2699

A list of known active, inactive, or abandoned solid and hazardous waste sites. Lists facility name, location, and current status such as "active site".

Superfund Sites in Wisconsin

Dale Ziege (608) 267-7533

A list of site names and locations.

Wisconsin Remedial Response Site Evaluation Report

Provides lists of contaminated facilities and their locations for:

1) The Inventory of Sites or Facilities Which May
Cause or Threaten To Cause Environmental Pollution
Bob Strous (608) 266-2699

2) The Spills Program List
Bob Strous (608) 266-2699

3) The Leaking Underground Storage Tank (LUST) Program List
Tom Fass (608) 267-3532

Bureau of Waste Management

Hazardous Waste Manifest

Aggie Cook (608) 266-2414

Tracks hazardous waste shipments from point of generation to disposal. This would include shipment of hazardous waste from all Wisconsin generators who choose to use the manifest forms.

Licensing

Regional Staff
Debrah Reddeman (608) 267-7567
Julie Ivanov (608) 267-7550

Another area in our SHWIMS database is the licensed facilities. This would include facilities licensed to transport hazardous waste, solid waste (including contaminated soil) and recycling waste, facilities who treat, store, and dispose of hazardous waste, and landfills.

Hazardous Waste Annual Reports

Debrah Reddeman (608) 267-7567

This database stores generation information for our large and small generators. Information includes the generator, type of waste they generated, how much generated, and where the waste was shipped to in a specific calendar year.

Hazardous Waste Notification

Aggie Cook (608) 266-2414
Debrah Reddeman (608) 267-7567

The notification form is one way to get into our SHWIMS (Solid and Hazardous Waste Inventory Management System) database system. In this database you can find facilities which have indicated that they generate, store, treat, dispose, or transport hazardous waste. It lists facility name, location address, type of activity, and contact name, address, and phone number.

Inventory and Licensing of Landfills

Julie Ivanov (608) 267-7550

Despite the title, it is no longer used for licensing. Currently it is used as a tracking system. The file contains facility information, type of landfill, acreage, and groundwater monitoring requirements.

Hazardous Waste Storage Tanks

Tim Mulholland (608) 266-0061

Provides facility location and contact information for facilities that have hazardous waste storage tanks.

Bureau of Watershed Management

Large Animal Feeding Operations

Doris Thiele (608) 266-3906

List of all livestock operations which have WPDES permits to control the discharge of manure. Common components include nutrient management, runoff control, and manure storage. Approximately 60 operations including poultry, swine, beef cattle, and dairy.

Regional staff maintain a similar list for orders issued to smaller livestock operations to control discharges of manure to the waters of the state.

Land Application Management Program (LAMP)

Greg Kester (608) 267-7611

This program was activated in November 1996. It tracks the generation, treatment, characteristics, compliance status, and final use or disposition of municipal wastewater treatment plant sludge, industrial sludge, industrial wastewater, by-product-solids, whey, septage, holding tank waste, and grease trap waste. It tracks every land application site in the state, every generator of sludge/waste, nutrient and/or hydraulic loadings per site, metal accumulation per site, volume of sludge land applied, sludge quality, permit requirements, and monitoring results. The database is a client server Oracle system.

Bureau of Integrated Science Services

Toxic Release Inventory

Dennis Phippen (608) 264-6043

Database of manufacturing industry and public facilities required to comply with SARA 313. It includes paper mills, airports, food products, foundries, chemical manufacturers and other industries. Toxic chemicals included are hazardous, caustic, carcinogenic, or those which deplete the ozone layer.

Bureau of Enterprise Information Technology and Application

GIS coverages relating to groundwater are available from the DNR by contacting John Laedlein, at (608) 264-8916. You may also find out more about these coverages by visiting the DNR GIS web site at [Http://www.dnr.state.wi.us/org/at/et/geo/](http://www.dnr.state.wi.us/org/at/et/geo/). Examples of available coverages are:

Groundwater Susceptibility Model (1:500K)
Water Table Depth (1:250K)
State Well Point Coverage
Bedrock Depth (1:250K)

Many other base layer coverages are available. There may be fees associated with getting this information.

Department of Transportation

Bureau of Highway Operations

Chloride Storage Sites
Jay Wells (608) 266-9490

Lists site locations and salt storage capacity.

Appendix 5

SOME SUGGESTIONS FOR RECRUITING AND TRAINING VOLUNTEERS FOR CONDUCTING A CONTAMINANT SOURCE INVENTORY BASED ON THE EL PASO, TEXAS EXPERIENCE

Early efforts

1. Make sure the mayor, city council, local agencies, etc. are aware of and support this effort.
2. Inform the media early so that they can be an ally in getting information out about this project.

Volunteer recruitment

1. Appoint a coordinator, either paid or volunteer, to be responsible for the project.
2. Set up a working group to assist and support the coordinator.
3. Target retirees from corporations, agencies or government with some related expertise (gas companies, utilities, environmental firms, planning and engineering departments, etc. Other possible organizations include the Audubon Society, American Association of Retired Persons, League of Women Voters, gem and mineral society, Association of Retired Federal Employees, junior and high schools, colleges, Boy Scouts, etc.
4. Use public services announcements, flyers, informational packets, informational meetings and the media to solicit volunteers, but a phone call to prospective volunteers is important to get their support.

Volunteer training

1. Schedule a training session for the volunteers. This could be preceded by an informational groundwater protection seminar to which the public and media are invited.
2. Allow volunteers to sign up to inventory areas in their neighborhood and/or other areas with which they are familiar.
3. Provide each volunteer with whatever materials he or she will need. This may include inventory forms, maps of assigned inventory WHP areas, a list of potential sources of contamination, answers to frequently asked questions, information on the geology and groundwater resources of the community, inventory suggestions, name tags, pencils, clipboards, mileage forms and time cards if appropriate.
4. Describe what is expected of the volunteers and how to use the materials they have been given.

Inventorying

1. You may want to appoint a team leader for a group of people to make sure everything goes well, that there is no duplication in the inventorying and there is someone to get the completed forms and maps.
2. Set a deadline by which the inventory work needs to be completed.
3. Encourage volunteers to use whatever methods are appropriate for gathering information and to avoid confrontation if challenged by a property owner.
4. Schedule a meeting during the inventorying, if appropriate, to identify any problems the volunteers are having.

Followup

1. Make sure to plan some recognition of the volunteers once the inventory work is complete.
2. Provide an opportunity for volunteers to be involved in making sure that the contaminant sources identified by the inventory are addressed in a WHP plan.

3. Send volunteers a copy of whatever reports are prepared as a result of their inventory work.

For additional suggestions, see Madarchik, Lillian Smith, 1992, How-to Manual for Groundwater Protection Projects: Volunteers and the Environment, El Paso (Texas) Retired Senior Volunteer Program (RSVP) in cooperation with the National Association of RSVP Directors, Inc., 26 pages plus appendices. Available from Winifred Dowling, El Paso RSVP Office (915-541-4375) and the Wisconsin Department of Natural Resources.